Claims.

1. A process for the combustion of a carbonaceous fuel having a high carbon content, a relatively high sulphur content and a low ash content, which process comprises:

(a) splitting a flow of carbonaceous fuel having a particle size compatible with combustion in a fluidised bed into a major proportion and a minor proportion;

(b) transferring the major proportion of the fuel to a pressurised fluidised bed combustor and carbonator (PFBC/C);

(c) combusting the major proportion of the fuel flow in the PFBC/C in the presence of air and in the presence of calcium oxide;

(d) recovering a flue gas flow containing solids including calcium carbonate and calcium sulphate from the PFBC/C;

(e) separating the solids from the flue gas flow;

(f) transferring the minor proportion of the fuel to a calciner;

(g) combusting the minor proportion of the flow of fuel in the calciner in the presence of both relatively pure oxygen and the solids flow separated in step (e) to convert the calcium carbonate in the solids flow into calcium oxide and carbon dioxide gas;

(h) recovering a flow of carbon dioxide gas from the calciner;

(i) recovering a flow of solids from the calciner including the calcium oxide generated in the calciner;

(j) transferring the flow of solids obtained in step (i) to the PFBC/C to provide the calcium oxide required in step (c); and

(k) recovering calcium sulphate and spent solids from the solids flowing through the PFBC/C and adding fresh calcium carbonate to the calciner to maintain a solids balance within the process.

2. A process according to Claim 1 wherein the carbon content of the fuel is less than about 85% by weight.

3. A process according to Claim 2 wherein the carbon content of the fuel is from about 80% to about 85% by weight.

4. A process according to Claim 3 wherein the carbon content of the fuel is about 83% by weight.

5. A process according to Claim 1 wherein the carbonaceous fuel is chosen from the group consisting of petroleum coke, anthracite, coal and natural gas.

6. A process according to Claim 5 wherein the carbonaceous fuel is petroleum coke.

7. A process according to Claim 1 wherein the carbonaceous fuel has an ash content of less than about 3%.

8. A process according to Claim 7 wherein the carbonaceous fuel has an ash content of less than 1% by weight.

9. A process according to Claim 1 wherein the PFBC/C and the calciner are both operated at the same pressure.

10. A process according to Claim 1 wherein the PFBC/C is operated under pressure and the calciner is operated at ambient pressure.

11. A process according to Claim 1 wherein the PFBC/C and the calciner are both operated at a pressure of from about 15 bar to about 20 bar.

12. A process according to Claim 1 wherein the PFBC/C is operated at a pressure of from about 15 bar to about 20 bar and the calciner is operated at ambient pressure.

13. A process according to Claim 1 wherein the sulphur content of the fuel is less than about 10% by weight.

14. A process according to Claim 13 wherein the sulphur content of the fuel is from about 3% to about 6% by weight.

15. A process according to Claim 14 wherein the sulphur content of the fuel is about 4% by weight.

16. A process according to Claim 1 wherein the weight ratio of fuel in the major and minor proportions is about 2:1.

17. An apparatus for the combustion of a carbonaceous fuel having a high carbon content, a relatively high sulphur content and a low ash content, which apparatus includes in combination:

(i) a carbonaceous fuel feed line for a flow of carbonaceous fuel of a size suitable for use in a fluidised bed combustor;

(ii) a splitter constructed and arranged to divide the flow of fuel in the fuel feed line into a major proportion and into a minor proportion;

(iii) a combustor fuel feed line constructed and arranged to receive the major proportion of the fuel flow from the splitter;

(iv) a pressurised fluidised bed combustor and carbonator constructed and arranged to receive and combust the major proportion of the fuel flow from the combustor fuel feed line;

(v) a compressed air line constructed and arranged to provide combustion air to the PFBC/C;

(vi) a calcium oxide transfer line having a first end and a second end, the first end being constructed and arranged to feed a solids flow including calcium oxide to the PFBC/C;

(vii) a separator feed line constructed and arranged to transfer a flow of flue gas containing entrained solids including calcium carbonate from the PFBC/C to a separator

constructed and arranged to separate the flue gas from the entrained solids therein;

(viii) an exhaust flue constructed and arranged to receive the flue gas from the separator;

(ix) a calcium carbonate transfer line constructed and arranged to receive the entrained solids containing calcium carbonate from the separator;

(x) a calciner fuel feed line constructed and arranged to receive the minor proportion of the fuel flow from the splitter;

(xi) a calciner constructed and arranged to receive the minor proportion of the fuel flow in the calciner fuel feed line and calcium carbonate from the calcium carbonate transfer line in step (ix);

(xii) an oxygen feed line constructed and arranged to provide oxygen for combustion to the calciner;

(xiii) a carbon dioxide line constructed and arranged to receive a flow of carbon dioxide from the calciner;

(xiv) the second end of the calcium oxide transfer line being constructed and arranged to receive a solids flow containing calcium oxide from the calciner;

(xv) a means to recover calcium sulphate and spent solids formed in the PFBC/C from the circulating solids; and

(xvi) a means constructed and arranged to add sufficient fresh calcium carbonate to the calciner to maintain the solids balance in the system.